

**United States Agency for International Development's  
Regional Center for Southern Africa in Collaboration with the  
Regional Electricity Regulators Association**

***Website Development***

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## 1.1 Purpose of your website

The provision and ongoing delivery of a website, like all service delivery methods, is as dependent on the quality of its management infrastructure and controls as it is on the quality of information being provided. Additionally, the pace of technological development in the Internet arena demands that organisations move with the times and seek opportunities to take advantage of any new services on offer.

### 1.1.1 How should a website be considered by an organisation?

It is essential for the success of any website that it is recognized as an integral part of the organization. It is a global, potentially low-cost communication and an (increasingly) transactional medium by which information and services can be made available at any time of day or night. As such, organizations need to consider how best the Internet can be used to provide access to information and to aid in the delivery of goods and services to customers.

A clear web management strategy is at the heart of developing this thinking. It must be an integral part of the organization's Corporate Communications and e-Strategies.

There are three main categories of website:

- **Information orientated:** these cover departmental publications, publicity, recruitment, news, statutory information, promotional material, providing advice, requesting responses and feedback. They may, for example, provide an electronic catalogue to users. Queries and requests can be handled via email or forms. Orders, and necessary payment, can be fulfilled through the conventional procedures.
- **Operational:** these are transactional websites geared towards e-business and cover the whole online process, from service selection through ordering and confirmation to online payment. These may be integrated with departmental systems to enable electronic transactions with the public and other customers.
- **Campaign:** such websites will support a specific publicity campaign, working directly with press, TV and radio advertising. All the media reflect the same messages and images. They may also provide an electronic catalogue to users with requests being handled via email. Fulfilment can be handled through the conventional procedures.

Many websites may incorporate aspects of each of the above. In all three categories the principle of developing a relevant and effective management strategy applies. This section sets out the five key components of a web management strategy:

- **Purpose** – what is the website for?
- **Strategic and operational management** – who is the owner and who is responsible?
- **Information and other content management** – how will material and services be provided and presented online?
- **Evaluation and ongoing development** – how should use and performance of the Website be monitored and how should the results be used for future Development?

### 1.1.2 what is the website for?

In establishing the aims of the website, each organization must ensure that:

- Users should be able to find your website;
- Users are clear about who owns the website and what it is designed to achieve;
- Navigation is clear and customer orientated, taking into account the needs of specific audiences;
- Goods and services being offered by the organization are effectively focused on the target audiences in terms of relevance and ease of accessibility
- Visitors are able to access the information they seek as directly as is practicable;
- Adequate security is in place when dealing with online transactions for the purchase of goods and services – and that neither the client nor the provider is compromised;
- Contact points (whether email, forms-based or telephone) must be staffed and all enquiries answered within reasonable timescales;
- The information published is up to date, accurate and relevant to the website;
- Content is clear, concise and appropriate;
- Links are kept up to date that users can rely on the website being available and is fast enough.

The tasks to be addressed when setting the aims and objectives are:

- Identification of your website's place in the organization's overall communications strategy;
- Identification of the audiences for your website, where possible on the basis of market research or dialogue with client groups;
- Understanding and responding to users' satisfaction with the website;
- Provision of resources, especially staff with the necessary skills, for the website team;
- Integration of the website with business processes, which might include electronic dealings with the public, publication of information, recruitment and consultation;

- Integration of the website into the department's strategy for electronic government and freedom of information;
- Integration of web services with other systems where practicable;
- Monitoring the development of the website and its success as a means of
- Meeting departmental objectives.

To ensure that the aims and objectives of the website are achieved they must be applied to key roles in the organization and placed under an appropriate management regime.

### **1.1.3 Benefits of publishing data on the Internet**

Although publishing documentation on the Internet initially seems to be little different to publishing in any other medium, there are a number of special considerations that need to be borne in mind. There are almost as many permutations of monitor resolution, color rendering, browser types, operating systems and user ability, as there are websites. Website Managers will have to consider many capabilities and standards to ensure that data is available to the widest audience.

There can be enormous benefits when documentation is published on the Internet, both for the publishing body and the general user.

#### **1.1.3.1 Information access**

A well designed website offers users a broader range of information than is available to them through conventional media, when they want it and in a form they can use.

To achieve this, the website should make use of the number of ways the web helps users find the documents they are looking for such as search engines, menus, navigational aids, indices and links between documents. Web navigation should also help users find the information they want within the document.

Some information such as menu pages and document summaries will have to be written specifically to be quickly scanned and understood.

It may be appropriate to make documentation available in a variety of differing formats. For example, some users may find it easier to download and print an entire document in Portable Document Format (PDF) and read it offline, whilst other may prefer to read it in online and on –screen in the form of a sequence of HTML pages.

#### **1.1.3.2 Accurate and up-to-date**

The web is easier to update or correct than print. Documents contained on the website can be a point of reference for both the public and your staff. Some departments provide a copy of their website on their intranet to facilitate this. A 'What's New' section should be

included and constantly updated so that users have a constant and familiar route to new and updated information.

To achieve accuracy, the maintenance of documents after publication should be planned and resourced. Each document should adhere to the site template and all data should be formatted in a consistent way. Particular care should be paid to the Cascading Style Sheet, which may be used to control the formatting of the website.

#### 1.1.3.3 Savings on print and distribution costs

Publishing data on the website should save on the printing, distribution and storing of printed documents and the wastage caused by overestimated print runs. Only the one copy needs to be maintained; as soon as a changed version is published it is available to everyone.

In order to achieve this publication in print and on the web should be part of one carefully planned publication process. This process should be audited regularly to ensure it is efficient.

#### 1.1.3.4 Opening up consultation

Regulators make policies and needs to collect informed views from organizations and individuals. The web can provide this opportunity and provide another channel for the distribution of the background documents that people need in order to contribute to the debate.

#### 1.1.3.5 Interactivity

The Web can speed up the process of individuals getting the answers they need. Websites could be used to direct enquiries to the right place in the organization to get an answer. Email can speed up the process of responding to them.

#### 1.1.3.6 Adapting to user needs quickly

Feedback and access statistics can tell web managers which pages are popular and which pages need further development. They can help identify gaps in information or services. A well managed website will respond to user needs and use the flexibility of the web to revise the website.

#### 1.1.3.7 Building individual relations with the citizen

Web technology provides a way for users to register interests and receive automatic updates of news and developments in the areas that interest them. Website content can be *personalized* to meet their interests and concerns, or provide local or national versions of information that are relevant to them.

#### 1.1.3.8 Saving costs on services

Properly supported by business plans and backend systems, the web can be used to improve services and reduce the cost of providing them.

## 1.2 Management of your website

The key to effective website management is the development and implementation of a strategy designed to ensure that it remains focused on what the organisation is there to deliver as well as on what information and services the target audiences expect to be able to access.

### 1.2.1 Strategic and operational management

Effective website management can be defined under three categories:

- Owning organization – Web strategy and management team
- Web service manager – Web Manager (Webmaster)
- Information providers – content owners and the editorial team

#### 1.2.1.1 The owning organization

The owning organization is responsible for establishing and maintaining the web management strategy and for ensuring that it integrates with wider strategic plans.

The equivalent of a senior editorial board is recommended. This will help ensure that key areas of the organization bring a full range of necessary skills and awareness to the process of setting aims and objectives for the website. The owning organization should also ensure that the resources are in place to achieve these aims. The following are examples of key areas of the organization that should be represented.

- Communications
- Corporate services
- Web service provision
- Content provision
- Resource provision
- Technology provision.

#### 1.2.1.2 Skill sets for setting web strategy

##### ***Communications: Executive Board***

At this level the corporate communications policy is set. Therefore a clear framework covering how the organization is to communicate information is required and is to be

used to determine the subject matter to be covered by the website. This approach will clarify the areas of content control appropriate to both the Internet and Intranet.

This role does not require day-to-day involvement. It is more about clearly defining the parameters within which information is to be made available in the public domain and establishing appropriate control mechanisms for handling potentially sensitive information.

## **1.2.2 Web service management**

A team of people will be responsible for ensuring that the website achieves its strategic aims. It does this through:

- Measuring achievement against overall aims and objectives set by the organization
- Effective website operation
- Effective content provision

This team should consist of people with a mix of publication, web and project management skills. A senior web manager is recommended to manage the team and ensure it carries out its tasks. A further division of labor between content and technical responsibilities is likely.

### **1.2.2.1 Meeting overall aims and objectives**

Clear, formal and regular progress reports against the aims and objectives are recommended to ensure that:

Ongoing and proposed new developments for the website have been measured against the objectives, coasted to ensure the best value and considered in relation to corporate developments;

- A business case has been prepared and approved to ensure sufficient resources (financial, time and people) have been allocated;
- Projects for delivery are being managed within agreed tolerances (again tied to the business case).

Reports need not be onerous, with the emphasis being on reporting by exception. They will help inform the broader organization of progress and give stakeholders the opportunity to raise concerns, issues and/or new developments.

The benefits of this process are:

- It provides a way to ensure continued adherence to delivery against set objectives;
- Open and clear communication on developments throughout the organization;
- Accountability for development work against clearly defined resource limits;
- Reduced risks on overlaps, duplication and failure to deliver against expectations.



#### **1.2.2.2 Effective website operation**

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The website strategy should also determine the management, communications and security regimes that will drive the service. These objectives are also the criteria against which service level agreements (under formal contract where external commercial suppliers are party to service provision) are set.

The web management team should:

- Manage the day-to-day operational interface with the Internet Service Provider (ISP)/hosting service in line with the agreed standards of service;
- Ensure the security and reliability of the ISP/hosting service;
- Determine the most appropriate technologies to be used for the production and availability of the information and/or goods and services;
- Manage the procurement and subsequent contracts or Service Level Agreements with Internet Service Providers /hosting services;
- Ensure that staffing levels are maintained for website content provision, in line with agreed standards of service;
- Keep key stakeholders within the organization informed of service performance against agreed targets and objectives.
- Co-ordinate publishing of Internet information;
- Set and maintain the organization's design and editorial specifications for the Web (commonly called style guidelines);
- Ensure that all information held on the website conforms to frameworks and standards set by the Cabinet Office, including the Government Web Guidelines and legislation, e.g., copyright and data protection.
- Ensure the website continues to work in a range of browsers and keep checking page links as they are easily broken;
- in partnership with the ISP, maintain the integrity of a website's structure, content and availability to agreed standards;
- Monitor website activity including bandwidth usage, analyze usage statistics, review the regularity of updating information and report the findings to the relevant personnel.

The web management team can contribute towards effective transactions by ensuring that the website effectively exchanges data between the user and the organization. They contribute to ensuring that transactions and authentication are secure. Effective transactions are likely to also require reform of other operational systems in order to accept electronic applications.

#### **1.2.2.3 Effective content**

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The web management team is also the overall point of responsibility for ensuring that content:

- Is line with the web management strategy
- Takes its place in a clear and navigable website structure
- Is consistent in style, intent and accuracy
- Communicates effectively and meets users needs.

The relevant units can still carry out production of material across the organization, but material can only be published once authorized by the appropriate posts in the web management team. The objectives for information providers must therefore be to ensure that:

- Information is accurate, relevant and up-to-date;
- Content held conforms to the style set down for the website;
- Contact points (email, telephone or interactive form) are staffed, inputs received are actioned and responses given within agreed targets;
- Metadata is provided for all new documents
- Information is provided by the agreed deadline.

There should be sufficient controls in place to check that content:

- Meets all editorial standards
- Is in line with overall communication strategy
- Is reviewed regularly by the information provider for currency and correctness
- Is removed or archived when appropriate
- Is easily accessible, navigable, with no broken links.

### **1.2.3 Mirror (ghost )copy of website**

The machine running the live website will usually reside at an Internet hosting datacenter. It is recommended that the web manager should keep one or more additional 'mirror' copies of the organization's website on a local PC. This is in order to facilitate the development and testing of updates to the website's content and organization prior to installing the changes on the live site.

One commonly adopted solution is for the web manager to establish a development environment and a second checking (or *staging*) environment in addition to the live website. It is possible to have the development and staging versions of the website on the same computer. However, it is important to keep the development and testing functions well separated regardless of whether the two mirror copies are on the same computer or separate ones.

Maintaining local copies of the website will also allow the complete and latest version of the site to be available at all times when only a dialed or slow speed connection to the Internet is available. It may also be desirable to automate the updating of the live website in order to minimize the time that it is unavailable while updates are being installed.

With a local development copy of the website, it is easy to see how any new documents will fit into the existing structure. Maintaining a staging copy of the website enables content and links to be checked and general usability to be tested prior to applying changes to the live website.

It is likely that a local PC's file system naming and organization rules will be different from those used on the live server. In order for the development and test environments to be of value and easy to use, it is important they should replicate the directory and file organization and naming used on the live website. Often this can be achieved quite straightforwardly by keeping all file and directory names and the references to them in hyperlinks within pages in lower case and always using relative URLs in internal hyperlinks (i.e., reference all links from the root of the website).

It is a role of the web manager to assess the technical requirements for the website development and testing environments in consultation with server managers. Typically the requirements will depend upon issues such as the size and complexity of the website and aspects of the regime under which it is managed, for example, whether it is being updated by more than one staff member or from multiple geographical locations.

#### **1.2.4 Records management**

Records Management is the systematic control and management of recorded information resources within an organization to ensure that the business, legal, regulatory and other requirements for the retention of authentic, evidential records are met.

There are also useful management concepts familiar to records management professionals that are of use to managing large volume information resources. Examples include retention management (usually achieved using schedules), protective marking of sensitive material (e.g. on Intranets), corporate file plans etc.

The underlying principle of records management is that records are kept for a period appropriate to their use. Specific procedures follow this principle to assist in its achievement in a systematic and structured way.

#### **1.2.5 Management documentation**

Whether the organization's website has been produced internally or by a design agency, it is important that each element of the construction is fully documented.

Personnel within the website management team will eventually move on and need to be replaced. Without adequate formal documentation a great deal of time will be lost in new staff determining, e.g., what mark-up to use in order to maintain a consistent look and feel.

A number of standards should be developed for the life cycle of a website or document, covering many of the following:

- The management structure that a document must be passed through before it can be published;
- The production of HTML pages, whether they are manually constructed or dynamically generated from a database;
- The production of other document formats, such as PDF and RTF from the source document;
- The organizational publishing standards, e.g. house style covering color usage, font specifications, logo placement, writing styles, etc;
- The lifespan control of on-line documents;
- The organization's designated web authors and their roles and responsibilities;
- The management and storage of archived documents, both electronically and paper based (records management);
- The management of the web-hosting service-provision contract;
- The administration of the web server (if controlled internally);
- The information back-up routine that has been adopted;
- The management of existing third party contracts for publishing or design work;
- Records of software and license agreements that are used by the website team,
- The administration and use of any escrow agent(s);
- The maintenance of an asset register of all domain names/sub-domains registered by/owned by the organization, e.g., date registered, when to be renewed, and corresponding IP numbers;
- Record of permissions granted by third parties for you to link to their website(s);
- Record of intellectual property rights permissions obtained, e.g., for text, graphics, audio or video materials used;
- Manage passwords keeping a record for emergency situations.

## 1.3 Evaluation

The evaluation of your website must not be overlooked. You need to judge the effectiveness of the website's content, design, navigation and underlying technology. There are many ways to do this but for many web managers, the most important will be access statistics derived from the web server logs. These can help measure the size of the audience and the patterns of how they use the website. They can reveal if the website is reliably delivering pages. However, it is important to understand the limitations of these statistics.

### 1.3.1 Evaluation and website metrics

Is the web strategy working? Does the navigation get people to the information they need? Is the server reliable? Measuring audience satisfaction, looking at feedback, understanding access statistics without measures such as these you will not be able to demonstrate value for money, or that you are meeting the needs of users and the aims of management. Therefore, regular (quarterly will be sufficient), formal evaluation exercises of both the content and the technology are strongly recommended.

Evaluation of website design and content can be carried out by drawing on:

Website access statistics provided by the ISP/hosting service provider. (The ISP/hosting services provider may either supply the raw web server logs or the results of their having been processed by analysis software);

- Responses via feedback tools (forms, databases, email addresses) ;
- Feedback from contributors to the website;
- Conventional audiences research, for example, focus groups and professionally authored online questionnaires.

The effectiveness of the website can also be judged by measuring achievement in other ways. For example, one recruitment website was evaluated on:

- The number of recruits that applied via the website
- Their performance of web recruits measured against that of staff recruited by other means
- The cost per recruit measured against the cost per recruit of publicity in other media.

If the ISP/hosting service supplier provides the results of analysing the web server logs as opposed to providing the unprocessed raw logs, the minimum information that should be required from them is statistics on:

- Number of unique users (visitors)
- Number of visits, and

- Page impressions (page views).

Some examples of other relevant metrics that can be identified from web server logs are:

- Error message counts (indicating that pages and other content were not served successfully); and
- Traffic analysis focusing on peak times (to assess bandwidth requirements) and 'dead' times

Additional useful information can include:

- Successful requests;
- Unsuccessful requests;
- Most frequently visited pages;
- Least frequently visited pages;
- Top entry pages;
- Top referring websites.

This information can be used to do such things as:

- Identify the most popular content,
- Review the navigation system for example, identifying orphaned pages,
- Identify referring websites (the sites from which users arrive at your website),
- Audit the level of response to electronic forms,
- Assess the effectiveness of marketing/PR campaigns in bringing traffic to the website,
- Provide information on users' platforms and browsers
- Identify users' DNS domains and thus visits from abroad or from within government

It is, in addition, recommended that web teams should:

- Give more importance to visitors, unique visits and page impressions than to hits;
- Take as much notice of error logs as of any other statistics;
- Determine who is using the website the most;
- Monitor current bandwidth use, and attempt to project future requirements;
- Archive server logs to use for monitoring trends over time.

The web strategy and management team should ensure, at the procurement stage, that ISPs/hosting services are offering to provide a full range of server log information.

It is acceptable to use HTTP cookies or session identities to track visitors' paths through the website (and this will be essential in e-transactional sites). The website should contain a clear statement of policy on the use of cookies.

Good practice dictates that the need for attention to the accuracy and timeliness of information will increase as the level of activity of a site increases.

### 1.3.2 Understanding user statistics

Website usage statistics are generally obtained by analysing the server logs. A typical HTTP server log contains in a log entry for each HTTP request (or hit) on the server. This entry will contain information about the web resource requested and the browser to which it was served. Software can be used to analyse and process these log files and provide a picture of the traffic to the website

- The number of visitors,
- Visitor duration and traffic pattern,
- Visitor origin including which country, when it can be identified,
- Visitor IP address,
- Visitors' technical preferences, such as browser type and version, platform.

This analysis will also indicate:

- Traffic peaks and troughs against time of day and day of the week
- Average daily user load,
- What obstacles may turn visitors away?
- Which pages get high traffic?
- Which directories are getting high traffic?
- Which graphic files are acceptable in terms of size and download time,
- Type of browsers (user agent) being used.

There is a wide range of software available for processing and analysing the potentially huge amount of raw data contained in web server logs. This ranges from the commercially available Web trends product family through to 'shareware' packages such as Usage and free software like Analog.

<http://www.webtrends.com>

<http://www.boutell.com/wusage/>

<http://www.statslab.cam.ac.uk/~sret1/analog/>

### 1.3.3 Advanced techniques

Log files can be further analyzed through advanced techniques. For example:

- **Sessions and visits** – the identification of sequences of page requests from individual users.
- **Session and visit duration** the measurement of the length of time that individual users spend viewing a website

- **Categorization** – a process whereby similar items, eg URLs, browsers, platforms, a specific directory, are grouped together for pattern matching.
- **Aggregation** – a process by which all combinations of entities and their resulting measurements are combined.

#### 1.3.4 Not the full picture!

You should be aware that there are limitations to the information that can be discovered from the analysis of Web server log files. The principal issues are:

- **Most ISPs use dynamic IP addressing.** This means they maintain a pool of IP addresses from which an IP number is 'loaned out' to each dial-up call for the duration of the call. A particular IP number will therefore be used by many different users and a particular user may appear at your website with many different IP numbers. The firewalls used at the interface between the Internet and corporate networks typically use a process named Network Address Translation (NAT), which has a similar effect. Firewalls also often use a process named Port Address Translation (PAT). With PAT, many users behind the firewall 'share' a single Internet IP number. The result of all this is that a specific IP number only rarely corresponds to a specific user and it is inappropriate to attempt to base estimates of the number of visitors to your website on a count of the different IP numbers found in server log files alone.
- **Caches** – almost all ISPs and many corporate users deploy 'perimeter caches' to conserve their Internet connection bandwidth and improve the speed with which web pages can be served to their users. These are often set up to work 'transparently' regardless of whether users have configured their browser's cache settings. Perimeter caches work by storing a copy of pages fetched by the client systems on whose behalf they are deployed. Subsequent requests for pages from other users behind a cache will be served from the cache if it already has a copy of the page. This may be done without any further reference to the origin server.



number of users of a website or for identifying users that revisit a website ('repeat users').

- **Browsers** -- some browsers are known to incorrectly identify the referring URL by indicating the previous page that the client was viewing even if the user recalled a bookmarked URL or typed a URL in to their browser' as opposed to following a link on the displayed page.

All of these issues mean that there have to be reservations concerning the reliability of estimates derived from standard web server logs of the number of users of a website or of their browsing behaviour when they visit a website. The Internet advertising industry develops and promotes standard website traffic metrics and methodologies for calculating them. It is recognised that the measurements are flawed for the reasons outlined above, however, it is believed that the metrics provide the basis for comparing one website's usage with another on the basis that these issues will affect all websites to broadly the same extent. There is, however, no sound basis for this belief.

#### **1.3.4.1 User agent masquerading**

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The term 'user agent masquerading' refers to browsers that transmit an incorrect browser identification string in the requests that they send to servers. Some browsers just do not properly identify themselves and are therefore not being identified in server log file records. Deliberate masquerading is also used for a number of reasons:

- Some websites alter the content they serve based on the browser identification string, so masquerading can be used to work-around this.
- Some websites reject requests from browsers that they are not intended to work with, so masquerading can be used to work-around this.
- Some users simply wish to remain as anonymous as possible.

### **Checklist: Auditing and statistical analysis**

The dynamic nature of the Internet environment makes it essential for the web team to carry out frequent monitoring of the performance and use of the website if high standards are to be maintained. It is also important that regular and authoritative reports on performance and usage are available to senior managers.

The Information Manager or editorial board should ensure that arrangements are in place for the following analysis and, where necessary, for maintenance of the appropriate standards of performance.

Description	
	Standards of performance over a modem connection 28.8 / 56.6 kbps over an open line and via a typical domestic ISP/hosting service. This is in order to replicate the access experience of a large number of users

	Checking using different browsers and screen resolutions, and with features such as scripts and images disabled
	Link checking. Broken links should be fixed within one working day
	Monitoring error messages: as much notice should be taken of error logs as of any other statistics
	Traffic analysis, focusing on peak times (to assess bandwidth requirements) and dead times (should essential maintenance require the website being down for a short time)
	Server log file analysis
	<p>The minimum information which should be required from hosts are statistics on, eg:</p> <ul style="list-style-type: none"> <li>Number of users (visitors)</li> <li>Number of visits (unique visits or sessions)</li> <li>Page impressions And also successful requests</li> <li>Unsuccessful requests</li> <li>Most frequently visited pages</li> <li>Least frequently visited pages</li> <li>Top entry pages</li> <li>Top referring websites</li> </ul> <p>This information should be used to identify the most popular content, to review the navigation system (e.g. identifying orphaned pages), to review referring websites, to audit responses to web-inspired email and electronic forms and to assess the effectiveness of marketing/PR campaigns. The information is also likely to be useful as a source of information on website performance, the quantity of documents requested, visitors' electronic distribution, the number of visitors and the platforms that visitors use, including browsers and screen resolution</p>